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NOTES ON THE FLORA OF LOWER CAPE COD.

F. S. COLLINS.

DURING the years 1906, 1907 and 1908 I was in the town of Eastham, Massachusetts for longer or shorter periods from April to September, and while flowering plants were not the principal object of my observations, I made the attempt to record and collect specimens of all the species that I noticed. The resulting list, while not containing many notable rarities, shows curious limitations and other peculiarities, and though the full list is not worth printing, some notes may be of interest to readers of RHODORA.

In the trip from Boston to Cape Cod, a gradually increasing sandiness of the soil is noticeable, from Middleboro on; this increase is nearly uniform all the way; at Provincetown, at the extreme end, it is not so striking to the traveler, as the latter comes to a compact town, the houses with little lawns and gardens; but all the soil for these lawns and gardens was brought from more fortunate places, and over the ridge that lies back of the town is an expanse of sand as desolate as any desert in Asia. At Truro, the next town up, the desolate character is most manifest to the ordinary traveler, the sand cliffs and dunes being unrelieved by any town, only by scattered houses here and there. Eastham is about twenty miles from the tip of the Cape, and while the scenery is not so impressive as that in Truro, the conditions must be practically the same as to vegetation, and its flora may be considered as fairly representative of lower Cape Cod.¹ The town is six miles long, two to three miles wide; the eastern side is all composed of larger or smaller sand dunes, a somewhat higher bluff facing

¹ By lower Cape Cod is here meant the part beyond the elbow at Harwich; upper on the map, but lower as being farther from the mainland.

the ocean, with a narrow, sharply sloping beach of coarse, loose sand at its base. The sea is continually eating away the base of this cliff, carrying the material out to sea, and building shifting and dangerous bars off shore. The western side of the town is flatter, apparently largely salt marsh covered with sand; near the shore it is still marsh, and the water is very shallow for a long distance, not reaching a depth of 18 feet until five miles from the shore. This shore of the Cape seems to be gradually moving to the west, the increase here probably compensating for the loss on the east shore. On this side of the town there are a few small brooks, apparently on the lines of the salt water creeks of the former marsh; but in the eastern part of the town there is absolutely no drainage system; the surface is dotted over with rounded depressions of all sizes and depths, with steep slopes, which quite cut them off from each other, so that there is no connection whatever between them. What vegetable matter there is collects at the bottom of these hollows, which vary in size and depth, from a shallow depression a few yards in diameter, with the grass greener at the bottom than on the surrounding surface, to large and deep ponds. In the richer ground at the bottom of the smaller hollows, and around the swamp or pond in the larger, are to be found species that could not exist on the barren sands above. There being no connection of one such hollow with another, each has a character of its own, interesting species being often found in one such hollow but not in others near by. Collecting in this region is wearisome, as one must continually climb up from one hollow to go down into the next; and there is a curious loneliness in these hollows, nothing in sight beyond their edge, and few sounds to be heard other than the wind and the surf. The climate is, on the whole, milder than that of the vicinity of Boston, extremely low temperatures being unusual in winter, and the wind from either the ocean or the bay tempering the heat of summer. The poverty of the flora is due to soil conditions, not to climate.

The plants may be roughly classified into four groups; those of general distribution, which one sees everywhere on the sandy roads and fields; marine species, growing in places under the influence of salt water; domestic species, living in the neighborhood of houses and barns; and "specialties," species to be found only in particular, limited stations. The marine species, those of the beaches and marshes, are practically the same as in the vicinity of Boston, the conditions

being about the same; *Salicornia ambigua*,¹ however, rare near Boston, is here as common as *S. europaea* and *S. mucronata*. *Solidago sempervirens* is very luxuriant, the heads being sometimes double the size of any I have seen in Essex or Middlesex. *Ammophila arenaria* is omnipresent on the sand dunes, and around the clumps one often sees the curious arcs of circles traced by the leaves, whipped about by the wind that seems always to blow there.

The domestic species do not differ much from those of more favored localities, but some of the more delicate or exacing ones are absent. There are balm of Gilead trees near every house, and near the older houses lilac bushes. At the place where I lived the lilac bush was as large as a small house, a dense thicket of stems below, a mass of leaves and flowers above; the catbird built its nest there, while the birds of the barnyard found it an excellent roosting place by day or night. *Leonurus Cardiaca* was about all the old barns, and *Marrubium vulgare*, equally common, seemed to take the place of catnip, which I saw nowhere. *Saponaria officinalis* and *Pastinaca sativa* were common, and *Malva rotundifolia* formed a narrow strip close to the walls of the houses and barns, seldom going far from them; *Tanacetum vulgare*, usually var. *crispum*, could often be found in places where now there was no apparent sign of human life, but in every case a search would show some old well or other indication that a home had once been there. The tansy seemed never to stray beyond the boundaries of the old yard, though the fence had gone a hundred years ago. On the slope of a hollow near my house there came out, after a rain, a carpet of little red, white and yellow stars; *Anagallis*, flowers about normal; *Mollugo*, flowers exceptionally large; *Potentilla*, flowers unusually small; so that all the flowers were nearly of a size.

The species of general distribution, those that one would notice along the road or from the train window, are comparatively few, but each represented by many individuals. The first to attract attention in spring is the beach plum, *Prunus maritima*; it is a rather dense shrub, growing by roadsides or in fields, seldom as high as a man's head; before the leaves appear it is covered with white flowers the whole length of the branches, so closely set that one can hardly touch the branch between them. In late summer and early autumn the fruit ripens, about as large as a small cherry; it is at first pale green,

¹As the names of plants mentioned in these notes are those used in the seventh edition of Gray's Manual, I have not thought it necessary to add the authors' names.

then waxy yellow, pink, red, purplish, and finally almost black; all these shades at once in a small bush, sometimes covering it as completely as did the flowers in April or May; it is a most attractive shrub, and the fruit, prepared by some native Cape Codder, makes delicious pies and preserves. In May and June the lupine abounds, growing in dense clumps on sandy stretches; it seems even more luxuriant than in more favored stations, and the racemes range in color from nearly true blue to pinkish purple. In stations too desolate even for the lupine the *Hudsonias* abound, both *H. tomentosa* and *H. ericoides*. They usually grow in dense clumps, each a single plant, the branches twisted like a Japanese dwarf tree; often there is nothing but bare sand between the clumps. When the wind blows, as it almost always does in Eastham, the sand drifts and catches among the branches of the *Hudsonia*, forming a dome-shaped heap inside the clump, sometimes only the tips of the branches projecting; in such cases the plant, without enough leaf surface free to maintain its life, throws all its energies into a dense and brilliant coating of yellow flowers. The bearberry, *Arctostaphylos Uva-ursi*, is very abundant, the shining leaves carpeting large stretches of sand; the wild carrot, *Daucus Carota*, is everywhere in the fields; in summer and early autumn *Chrysopsis falcata* abounds, with its own particular shade of yellow. *Corema Conradii* is frequent and showy in spring, but not so general as the other plants just mentioned. Few species of trees occur, but the pitch pine is everywhere, forming dense forests of stunted individuals; some fifty or sixty years ago it was planted extensively in the most barren places, and one can still trace the regular rows in which it was set out. Now it is continually spreading, covering large areas that were cultivated fields fifty years ago. Black snakes are plentiful among the pines, and have the pleasing habit of hanging by the tail from a limb, looking like a broken branch until you come in contact with them. The locust, *Robinia Pseudo-Acacia* is common, evidently long ago escaped; there are some scrub oaks, but few other trees. Of cryptogams other than algae, there are few noticeable species. In moist places are often stretches of densely packed *Woodwardia virginica*; common brake grows under the pines; other ferns are not much in evidence. Trees and fences are often completely covered with a lichen of the bright yellow that one sees only near salt water; crisp *Cladonias* alternate with the blackberry vines in the fields, but there are no rock lichens, as there are no rocks to support them.

Fleshy fungi vary in frequency; in damp seasons there is sometimes a most abundant growth of *Amanita muscaria* and one or more species of *Boletus*, all through the pine woods; giants, all of them.

The three classes, marine, domestic and general, include only a minority of the species noted; more were found in special limited stations. There is absolutely no drainage in the eastern part of the town, and in each pond or swamp, within its own hollow, lives a flora independent of the others and with a character of its own. The water was very low in the summers of 1907 and 1908, and there was an excellent chance to study the floras of these neighboring but isolated stations. Meeting-House Pond may be taken as an example; *Castalia odorata* was plenty; at times the water was so low that the dry leaves crackled under my foot as I walked near the shore; its duplicate in miniature, *Nymphoides lacunosum*, floated in a band, a short distance from the edge. *Pontederia cordata*, *Lobelia Dortmanna* and *Eriocaulon septangulare* covered quite a zone, from where the water had been in the spring, to some distance below its summer level. Around the blue water was a broad belt of white sand, like the cornea about the iris; this was variegated by vines of flowering cranberry, and geometrical patterns made by a prostrate purple grass. *Hydrocotyle umbellata* grew where there was any shade, *Gratiola aurea* and *Xyris caroliniana* were plenty near high water line. In July, all around the pond, among the grass, was the beautiful *Sabatia dodecandra*; I did not find it at any other station in the town; as this passed away, its place was taken by *Coreopsis rosea*, and in late summer two white Eupatoriums, *E. hyssopifolium* and *E. perfoliatum*, formed adjacent concentric rings, the former on the inside. No other pond had just this combination, and each had some special character of its own. One was fairly alive with *Myriophyllum tenellum*, which was absent from the others; another made a specialty of *Potamogeton*, which was lying in great windrows on the shore.

The limitation of species to single localities makes it rather unsafe to say that any species does not occur in Eastham, but I feel sure that any species I did not see, if occurring at all, must be rare. As species of single stations may be noted, among others, *Apios tuberosa*, *Vitis labrusca* and *Spiraea tomentosa*; *S. latifolia* was not seen at all. *Epilobium coloratum* and *E. adenocaulon* were found, but no *E. angustifolium*. *Asclepias incarnata* var. *pulehra* was not uncommon, *A. amplexicaulis* was generally distributed, *A. tuberosa* I saw once only;

farther up the cape it is abundant, and there was no *A. syriaca*. Of *Solidago* I saw only five species; *S. sempervirens* already mentioned, *S. nemoralis* in dry fields, *S. tenuifolia* common by roadsides, *S. ulmifolia* once near a swamp, and *S. odora*, common in fields. *Hieracium* was represented by *H. Marianum*, *H. venosum* and *H. Gronovii*, all common; no introduced species were seen. There was an abundance of *Antennaria* in the fields, varying much in size and appearance, but it proved to be all *A. plantaginifolia*. *Gerardia paupercula* was the only representative of that genus; *Ranunculus repens* was the only crowfoot, and that I saw only in one station; the *Ranunculaceae* in general were poorly represented. I saw no *Oenothera* except *O. muricata*; there was a much condensed form of *Cirsium pumilum* and some fairly good *C. discolor*, but no *C. lanceolatum* nor *C. arvense*; it speaks much for the poverty of a soil when it will not support Canada thistle. Of the *Saxifragaceae* I saw only a few plants of *Ribes oxycanthoides*, and the *Cornaceae* were quite unrepresented. So were the genera *Rudbeckia*, *Arctium*, *Geranium*, *Thalictrum*, *Anemone*, *Aquilegia*, *Berberis*, *Desmodium* and *Crataegus*. In riding on the train to Boston it is interesting to notice, one after another, the appearance, often in abundance, of the species lacking in Eastham; a great patch of *Thalictrum* in Brewster; *Rudbeckia* in Harwich, and so on. I would have added succory as appearing near the old glass works in Sandwich, but for one plant that I found in Eastham in what had been a strawberry bed, but now run to weeds; beside it were two tall blackberry bushes, the only high blackberries in the region, where the common blackberry is *Rubus villosus* var. *humifusus*, lying flat on the ground and working havoc with shoes and stockings, but supplying what seems to me the finest fruit of all the blackberries, large grained, sweet and juicy. The flat artificial level of another deserted strawberry patch was a dense mass of *Verbena hastata*, as high as a man's head; I did not see this species elsewhere in the town. Even as regards weeds there are peculiarities. A few stunted plants of *Amaranthus retroflexus* and *A. graecizans* were the only representatives of the genus; occasional plants of *Anthemis* *Cotula* and *Linaria vulgaris* were to be seen, but they were by no means common. *Artemisia Stelleriana* abounded along the shore, *A. caudata* everywhere; the latter species seems at home in sand inland as much as at the shore. Some of the more recent importations in weeds were well established; *Bromus tectorum*, *Brassica arvensis* and *B. juncea*, *Sisymbrium altissi-*

mum as well as the old *S. officinale* var. *leiocarpum*. *Euphorbia Cyparissias* had spread from old gardens, and in many cases had bracts of a very deep orange, brighter than I remember seeing elsewhere.

The family *Cistaceae* seemed to find conditions fairly comfortable, as *Helianthemum canadense* and *H. majus*, *Hudsonia tomentosa* and *H. ericoides*, and *Lechea maritima* were all abundant. Of the *Iridaceae*, *Iris versicolor* was not uncommon; *Sisyrinchium angustifolium* and *S. atlanticum* seemed about equally frequent. Of *Liliaceae* I saw only *Lilium philadelphicum* (in 1906 only; 1907 and 1908 were dry seasons and it did not appear), *Smilacina stellata*, *Smilax rotundifolia* and *Asparagus officinalis*, the last escaped from cultivation and common. In nearly every family curious absences could be noted, which it would take too long to detail. I secured only six species of *Carex*, three of *Cyperus* and six of *Juncus*; evidently the locality is better suited to *Juncus* than to the others. Violets were not common, but in one place I found *Viola fimbriatula* growing and fruiting freely in pure quartz sand, no other plant in its vicinity but *Ammophila*. The common *Oxalis* was *O. stricta*, with large flowers of a deeper yellow than in *O. corniculata*, our usual species near Boston. The most showy flower was *Hibiscus Moscheutos*, whose large, Hollyhock-like flowers seemed strangely out of place in their impoverished surroundings.

It remains to mention a few species, whose occurrence here is of definite interest. Along the roadsides all through the town, was a plant with dense tufts of gray-green linear leaves, which in early summer bloomed and proved to be the old-fashioned garden pink, *Dianthus plumarius*. It does not appear in the Manual, but is evidently quite at home here. *Trifolium dubium*, not a common plant generally, was not infrequent. The only *Amelanchier* was the rather unusual *A. oblongifolia* var. *micropetala*; *Plantago aristata* var. *Nuttallii*, a form not mentioned in the Manual, was not uncommon in dry fields. In RHODORA, Vol. XI, p. 58, will be found mention of a small *Aster* which I found here, which has proved to be of interest in settling a doubtful point as to *A. surculosus*; and the occurrence here of *Agropyron pungens* considerably extends its range, and probably establishes its title, which has been disputed, to native American citizenship. The finding of *Lactuca Morssii* also extends a range, in this case of a "RHODORA species." In closing this list of species, I must add the consecrated formula. "Through the kindness of Prof. Fernald of the

Gray Herbarium the specimens in question have been identified" etc., etc. In this case the number of specimens was large, the proportion of interesting ones small, and more than the usual thanks are due for the work involved. All the specimens have been incorporated in the herbarium of the New England Botanical Club.

What general conclusion, if any, can be drawn from these notes? In Eastham the conditions of sterile sandy soil, lack of drainage or water courses, remoteness from active human influences, and increased influence of saline conditions are carried to an extreme, as compared with the region near Boston, with much the same climate; and we find:—within the range of salt water, practically the same flora; strictly aquatic plants, practically the same; domestic plants, not cultivated but thriving near cultivation, largely the same but keeping close to house or barn; weeds, many absent, a few, *Spergula* for instance, more abundant than usual, but most species in a reduced form; trees few and stunted but covering much ground; few fruit-bearing plants, but two, the beach plum and the low blackberry, luxuriant and with delicious fruit; herbaceous plants with few species but often many individuals, grasses, sedges and rushes especially few species; of the larger families *Cistaceae* and *Leguminosae* apparently best represented, *Labiatae*, *Ranunculaceae*, *Cornaceae* and *Saxifragaceae* with poorest representation; ferns, fungi and lichens, not strong; algae, marine and fresh water, well represented. On the whole, probably not half so many species as would be found in Swampscott, Cohasset or any similar seashore town near Boston. Poverty everywhere when out of reach of fresh or salt water.

Is time likely to bring any change? It is hard to say, but when we compare the desolate appearance of the town today with the accounts of what it has been, it seems to be going to the bad generally. As a boy I remember great fields of corn and rye where now are only dense woods of pitch pine; I have seen linen cloth, spun and woven on the spot, from flax raised there. Of course much of this change is due to changed social conditions; a farmer's family can no longer produce most of what it needs; work is specialized, and two or three acres of asparagus, tended by one man for three or four months of the year, now bring more actual money to the family than the whole labor of a family on a large farm did in the old times. But for the town as a whole, the diminution of fertility has been marked. In the History of Eastham by the Rev. Enoch Pratt, published in 1844, changes

of this kind are noted. Speaking of a part of the town he says, "This barren tract, containing about 1700 acres, which now has hardly a particle of vegetable mould, formerly produced wheat and other grain." But of the part of the town under cultivation he says "The raising of grain is the principal business to which farmers attend. More corn is produced than the inhabitants consume. More than a thousand bushels are sent to market, and in years past more than three times that quantity has been exported. This is the only town in the county that raises sufficient for its own consumption." No grain whatever is now raised. "Except a tract of oaks and pines adjoining the south line of Welfleet, and which is about a mile and a half wide, no wood is left in the township. The forests were imprudently cut down many years ago, and no obstacle being opposed to the fury of the wind, it has already covered with barrenness the large tract above described, and is still encroaching on other parts." The pitch pines are now covering not only the deforested area to which he refers, but also much of the ground which produced the grain for export. The sand no longer blows over this area, and in time, probably a long time from a human point of view, vegetation might find more favorable conditions, but a new element has entered the problem, of which the Rev. Mr. Pratt never dreamed. Every year wood fires are started by sparks from the locomotives, often killing the trees over hundreds of acres, and what is worse destroying all the leaf mold and other vegetable matter that has accumulated, so that it is doubtful if another growth, even of pitch pine, is possible. On the whole, it seems probable that less favorable rather than more favorable conditions are to be looked for as to the plants of general distribution. The little local floras of the ponds, however, will probably long continue.

MALDEN, MASSACHUSETTS.

THE NORTH AMERICAN SPECIES OF BARBAREA.

M. L. FERNALD.

A recent attempt to determine satisfactorily some specimens of *Barbarea* from different regions of North America has led the writer to make a somewhat detailed study of the genus. In the course of this study it has become apparent that the species, which are notoriously difficult of delimitation, have more definite characters of foliage and fruit than we have generally supposed, and that in some cases our interpretation must be changed by a more accurate knowledge of certain of the older species. In the interpretation of the European species the writer has gained much assistance from the treatment of the genus and the critical notes of Rouy & Foucaud ¹ and the earlier observations of Des Moulins.²

As commonly interpreted, *Barbarea* in America consists of *B. vulgaris* R. Br. (including *arcuata*) with divergent or arcuate-ascending pods, introduced eastward but said to be indigenous from Lake Superior northward and westward; *B. stricta* Andr., with closely appressed pods, occurring across boreal America and coming south to Virginia, the Great Lake region, Missouri, and along the Rocky Mts.; and *B. verna* (Mill.) Asch. (*B. praecox* Sm.), an introduced garden-plant. Recently, however, Dr. Rydberg has characterized the plant of the Rocky Mts. as *B. americana*.

An inspection of all the American material in the Gray Herbarium and the herbarium of the New England Botanical Club shows that our *Barbareas* fall into two rather clearly marked groups. The first group consists of plants which are represented in these collections only by specimens from the older settled portions of America (chiefly in the East) and which, although now naturalized, were probably introduced from Europe. In all these plants the beak of the silique, formed by the persistent style, is very slender and elongate (2-3 mm. long) and the uppermost leaves of the stem are coarsely dentate, angulate, or lobed, but very rarely pinnatifid. These plants include the introduced *Barbarea vulgaris*; another probably introduced plant which has been passing in the Eastern States as *B. stricta*; and a singular short-

¹ Fl. de France, i. 196-203 (1893).

² Catalogue raisonné des Phanérogames de le Dordogne, 2e. fasc. du Suppl., 20-54 (1849).

podded plant from Seattle, Washington, which is specially commented upon in the Synoptical Flora.

The second group is typified by the sometimes cultivated European *Barbarea verna* (Mill.) Asch. (*B. praecox* Sm.), the silique of which has a characteristically short broad beak (0.5–2 mm. long) and the cauline leaves of which are lyrate-pinnatifid. Besides this introduced *B. verna*, however, we have in America a number of well marked indigenous plants with short thick beaks and usually lyrate-pinnatifid upper leaves. The most widely distributed of these is the plant named by Dr. Rydberg *B. americana*, but taken by many other recent authors to be indigenous forms of both *B. vulgaris* and *B. stricta*.

The relationships and identities of certain of these plants demand special consideration and they may be most appropriately discussed in the order mentioned in the two groups above.

Barbarea vulgaris, the common introduced plant of the East, is fairly well understood, but the status of *B. arcuata* Reichenb., sometimes distinguished as a subspecies or a variety from *B. vulgaris* is more doubtful. *B. arcuata* is often separated, at least varietally, by the slightly larger flowers which are more loosely disposed in anthesis, the slightly arcuate and more slender siliques, and the narrower seeds; but in the American specimens examined these characters do not seem sufficiently marked to make it clear that we have two different plants.

The plant which has been passing in the eastern United States as *Barbarea stricta* Andrz. differs, as already intimated, from the more northern indigenous plant which has been identified with it in the longer slender beak of the pod and the angulate or coarsely toothed but rarely pinnatifid upper leaves. This plant of the Eastern States, like *B. vulgaris*, is found chiefly in the neighborhood of settlements, and though it is commonly recognized by its closely appressed and crowded siliques it is often found with some of the pedicels spreading in such a way as to suggest *B. vulgaris*. With its foliage, siliques, and beaks essentially as in *B. vulgaris*, and differing only in having the siliques closely appressed, this plant seems more appropriately considered a variety of the latter species than specifically distinct. But that the plant is really *B. stricta* Andrz., with which it has generally been identified, is very improbable. True *B. stricta* of Europe (*B. parviflora* Fries) as shown by specimens from Fries, Blomberg, Andersson, and Heimerl and as treated by recent European writers on the genus, is a plant of northern and northeastern Europe with the upper

cauline leaves oval, crenate, and slightly if at all lyrate or angulate, and the stoutish beak of the silique only 0.5–1 mm. long. Our common plant of the East which has passed as *B. stricta* has the upper cauline leaves coarsely angulate-dentate and the beak of the silique is rather slender and 2–3 mm. long. In these characters it matches material from England and western and central Europe which has been erroneously passing as *B. stricta*, but which is treated by Rouy & Foucaud as *B. vulgaris*, subsp. *vulgaris*, var. *longisiliquosa* Carion.

The other plant with elongate slender style, the plant from Seattle, Washington, specially noted in the Synoptical Flora¹ on account of its very short siliques, is apparently the var. *brachycarpa* of Rouy & Foucaud.

Of the plants of the second group, i. e., those with the upper cauline leaves mostly lyrate-pinnatifid and with short thick styles, *Barbarea verna* (*B. praecox*) needs no discussion. The indigenous species, however, demand special comment. The most broadly distributed of these has short thickish pedicels and is the plant thought by early students of our flora to be identical with the European *B. praecox* (*B. verna*). Richardson, Chamisso & Schlechtendal, Sir Wm. Hooker, Torrey & Gray, and their contemporaries all considered it *B. praecox*, Hooker separating it from *B. vulgaris* by the “*stigma* short, nearly as broad as the valve.”² Nuttall apparently considered it a distinct species, his *B. gracilis*,³ from “Oregon,” but subsequent authors have generally identified it with the European *B. vulgaris* or *B. stricta*. From *B. verna* (*B. praecox*), to which the indigenous plant is very closely related, it differs in its basal leaves; those of the former plant having very numerous small leaflets, those of our northern species very few or none. From *B. vulgaris* and its variety *longisiliquosa* our plant is quickly separated by the characters already emphasized. From true *B. stricta* the plant is readily distinguished by its much longer pods and by the narrower more lyrate-pinnatifid upper leaves. Recently this distinct plant with “pod 2–2.5 cm. long and scarcely 2 mm. wide, slightly angled, ascending, or at first nearly erect, on pedicels 2–3 mm. long; style very short, scarcely 0.5 mm. long,”⁴ has been named by Rydberg *B. americana*. The plant

¹ Robinson in Gray, Syn. Fl. i. fasc. 1. 150 (1895).

² Hook. Fl. Bor.-Am. i. 40 (1829).

³ Nutt. ex Torr. & Gr. Fl. i. 75 (1838).

⁴ Rydb. Mem. N. Y. Bot. Gard. i. 174 (1900).

covered by his description varies in the degree to which the pods are appressed, but as Rydberg's description indicates, there is no clear line to separate these minor variations. As described by Rydberg his *B. americana* occurs from "Northwest Territory" to Montana and Nevada; but the plant is widely distributed in our boreal and mountain regions, occurring from Ungava Bay, Labrador, south to river-banks and mountain-ravines of northern New England, northwestward to arctic Alaska, the Aleutian Islands, and adjacent northeastern Asia, and southward in western America to Colorado, and southern California. But clearly defined as is this plant, which is so typically a species of our boreal flora, it seems to have had but one well established name (excluding the doubtfully published *B. gracilis* of Nuttall¹) prior to that assigned to it by Rydberg. In 1824, Ledebour published the Siberian *B. orthoceras*² with the pedicels of the siliques erect. Material of this species collected in Amur by Maximowicz is quite identical in basal and cauline leaves, strongly ascending pods, and short thick styles with American material which has been determined by Dr. Rydberg as *B. americana*; and there seems no reason why the name *B. orthoceras* Ledeb. should not be taken up for the plant which, widely distributed in our boreal and montane regions, extends, like so many of our other plants, by way of the Aleutian Islands and northwestern Alaska to the northeastern regions of Asia.³

In the southern part of its range *Barbarea orthoceras* is less characteristic than northward, the siliques tending to be longer, more divergent, and somewhat remote instead of strongly ascending or appressed and forming a dense slender raceme. Many transitional tendencies occur, however, and the longer-podded extreme seems best considered a variety of *B. orthoceras*, standing in the same relation to it as *B. vulgaris* to its var. *longisiliquosa*.

Another indigenous species, of unusual interest because of its peculiar habit of bearing in the lower part of the primary racemes leafy bracts

¹ Nuttall apparently did not formally publish *Barbarea gracilis* though it is ascribed to him by Torrey & Gray with the remark that "Mr. Nuttall thinks that the var. β [var. *gracilis* from "Oregon"] is a distinct species which he calls *B. gracilis*. Nuttall's plant, labeled distinctly in his own handwriting "*Barbarea gracilis*. *B. vulgaris*, β . *gracilis* DC. Oregon woods," is in the Gray Herbarium and has been re-labeled by Dr. Rydberg "*B. americana* Rydb. P. A. R."

² Ledeb. Hort. Dorp. (1824) and Fl. Ross i. 114 (1841).

³ It is probable that *Barbarea orthoceras* occurs across the colder regions of Eurasia to arctic Europe. Rouy & Foucaud, discussing the European species say: "La forme des régions arctiques est le *B. orthoceras* Ledeb."; and Nyman's Conspectus and the Index Kewensis treat Fellman's *B. stricta* from Lapland as *B. orthoceras*.

which subtend the flowers, is confined to the southern Alaskan and Aleutian region, extending by way of the Aleutian Islands to the coast and islands of Kamchatka and Amur. This distinct plant, which, in the presence of well developed floral bracts suggests the local *Barbarea bracteosa* Guss. of Sicily and the Neopolitan district, differs from that southern plant in many details. It seems, with little question, to be C. A. Meyer's *B. planisiliqua*, originally described from the region of the Ochotsk Sea but stated by Tiling in his more detailed account of the plant to occur also on Unalaska.¹ The citation of *B. planisiliqua* from Unalaska is significant since, of the numerous specimens of *Barbarea* examined from Alaska, only one species — the plant under discussion — has been found from Unalaska. During the Jaggard Expedition to the Aleutian Islands in 1907 Dr. Edwin C. Van Dyke collected both *B. orthoceras* and the plant with leafy-bracted inflorescence; and it is notable that he, like earlier collectors, found on Unalaska only the latter species.

The conclusions reached in this study of *Barbarea* in North America may be summarized as follows.

* Beak of the silique slender, 2-3 mm. long: uppermost leaves incised, coarsely dentate, angulate, or lobed, but rarely pinnatifid.

BARBAREA VULGARIS R. Br. Glabrous throughout: radical and lower cauline leaves green, rarely purple-tinged, usually pinnatifid; the terminal lobe large, suborbicular to elliptic-oblong; lateral lobes 2-4 pairs (rarely none), the upper pair larger than the lower: middle leaves lyrate-pinnatifid: uppermost leaves obovate or oblong, coarsely dentate or angulate above the middle, often incised but scarcely pinnatifid below: flowers orange-yellow, showy: siliques 2-3(-4) cm. long, subterete to quadrangular, on more or less divergent or spreading-ascending slender pedicels.— R. Br. in Ait. Hort. Kew. ed. 2, iv. 109 (1812); Am. auth., as to the introduced plant of the East. *Erysimum Barbarea* L. Sp. Pl. ii. 660 (1753). *Sisymbrium Barbarea* Crantz, Stirp. Austr. fasc. i. 54 (1769). *Erysimum lyratum* Gilib. Fl. Lith. ii. 59 (1782). *B. taurica* DC. Syst. ii. 207 (1821).² *B. arcuata* Reichenb. Flora, v. 296 (1822).¹ *B. vulgaris*, γ . *arcuata* Fries, Novit. Fl. Succ. 205 (1828); Gray, Man. ed. 2, 35 (1856) in part. *B. lyrata*

¹ "Ich sah Pflanzen aus verschiedenen Gegenden Ost-Sibiriens, aus Kamtschatka, von den Kurilen und aus Unalashka" — Regel & Tiling, Fl. Ajan. 46 (1858).

² *Barbarea taurica* and *B. arcuata* are treated by Old World students of the genus as identical, and by many the plant (under the name *B. arcuata*) is kept separate from *B. vulgaris*. If such separation is maintained the name *B. taurica*, it should be noted, will have to be used instead of *B. arcuata*, which was published in the succeeding year.

Asch. Fl. Brandenb. i. 35 (1864).¹ *B. Barbarea* [as *barbarea*] MacMillan, Met. Minn. Val. 259 (1892). *Campe Barbarea* [as *barbarea*] W. F. Wight in Piper, Contrib. U. S. Nat. Herb. xi. 303 (1906) as to synonyms but not as to plants cited.—Brooksides, meadows, roadsides, and waste places, chiefly near settled regions, abundantly naturalized from Eurasia; New England to Michigan, Kansas, and Virginia.—A double-flowered form is established about the city of Quebec.²

Var. *hirsuta* (Weihe), n. comb. Basal leaves and often upper leaves and stem hirsute.—*B. hirsuta* Weihe, Flora, xiii. 257 (1830). *B. vulgaris*, β . *bracteata*, sub-var. *hirsuta* Rouy & Foucaud, Fl. Fr. i. 198 (1893)—Introduced in fields at North Berwick, Maine (*Parlin*).

Var. *BRACHYCARPA* Rouy & Foucaud. Foliage as in typical *B. vulgaris*: siliques 1–1.5 cm. long.—Fl. Fr. i. 198 (1893). *B. stricta*, form, Robinson in Gray, Syn. Fl. i, fasc. i, 150 (1895). *Campe stricta* W. F. Wight in Piper, Contrib. U. S. Nat. Herb. xi. 303 (1906) as to plant, but not as to name-bringing synonym.—Introduced at Seattle, Washington (*Piper*).

Var. *LONGISILQUOSA* Carion. Foliage as in *B. vulgaris*: siliques closely appressed to the rhachis, 2–3 cm. long.—*B. vulgaris*, subsp. *B. rivularis*. β . *longisiliquosa* Carion, Pl. Saône-et-Loire, 16 (1859) according to Rouy & Foucaud, Fl. Fr. i. 199 (1893)—original description not seen. *B. vulgaris*, var. *stricta* Gray, Man. ed. 2, 35 (1856) and subsequent authors, in part, not Regel. *B. stricta* Bor. Fl. Centre de la Fr. ii. 48 (1840); Robinson in Gray, Syn. Fl. i, fasc. i. 150 (1895) as to the eastern plant in great part, not Andrz.—Naturalized from eastern Quebec to Michigan, Missouri, and Virginia.

* * Beak thickish, 0.5–1 (rarely 2) mm. long: uppermost leaves usually lyrate-pinnatifid.

+ Basal leaves with numerous (10–20) lateral leaflets.

B. Verna (Mill.) Asch. Leaves all pinnatifid; the basal with rounded-oval or -oblong terminal lobe and numerous smaller lateral lobes: petals 6–8 mm. long, bright yellow: pedicels 3–8 mm. long, as

¹ *Barbarea lyrata* Asch. was based on *Erysimum lyratum* Gilib. (1782), a name which antedates the maintained *Barbarea vulgaris* R. Br. (1812) by thirty years. But by Article 48 of the Vienna Code "the first specific epithet . . . must be retained or must be re-established, unless, in the new position there exists one of the obstacles indicated in the articles of section 7." and by Article 51 (1). "Every one should refuse to admit a name . . . when the name is applied in the plant kingdom to a group which has an earlier valid name." Our plant as an *Erysimum* already had the valid name *Erysimum Barbarea* L. (1753), therefore the specific name *lyratum* is inadmissible. For discussion of this principle of 'still-born (*totgeborenen*)' names see Schinz & Thellung, Bull. Herb. Boiss. Sér. 2, vii. 101 (1907), also circular-letter of 10 December, 1907; and Rendle & Britten, Journ. Bot. xlv. 433 (1907).

² In June, 1895, Dr. B. L. Robinson collected at Waverly, Massachusetts, a plant which closely simulates the Asiatic *B. plantaginea* DC., but its immature condition renders it unwise so to name it with positiveness. *B. plantaginea*, which appears only varietally separable from *B. vulgaris* has all but the lowermost leaves elliptic or oblong and merely dentate, the principal cauline leaves of *B. vulgaris* (excluding the uppermost) being lyrate-pinnatifid.

thick as the long (4-8 cm.) slightly flattened rigid ascending siliques.—Fl. Brandenb. 36 (1864). *Erysimum vernum* Mill. Dict. ed. 8, no. 3 (1768). *Erysimum praecox* Sm. Fl. Brit. ii. 707 (1800). *B. praecox* R. Br. in Ait. Hort. Kew. ed. 2, iv. 109 (1812).—Somewhat cultivated as a salad under the names BELLE ISLE CRESS, EARLY WINTER CRESS, and SCURVY GRASS, and locally naturalized in the Eastern and Southern States.

+ + Basal leaves simple or with 2-6 lateral leaflets.

+ Stems or branches leafy only to the base of the finally elongate racemes.

B. ORTHOCERAS Ledeb. Grabrous, strict, the stem and lower leaves often purple-tinged: basal leaves oblong or elliptic, simple or with 2 or 4 small lateral leaflets: lower and middle cauline leaves more decidedly lyrate-pinnatifid, ordinarily with 4-12 small leaflets: uppermost oblong or narrowly obovate, lyrate-pinnatifid, with few basal lobes: racemes in anthesis densely flowered, in fruit elongate and slender: sepals pale: petals pale yellow, 2.5-5 mm. long: siliques subterete or compressed, not conspicuously angled, 2-3.5 cm. long, somewhat crowded, strongly ascending or appressed, on thick pedicels 3-8 mm. long.—Hort. Dorp. (1824), and Fl. Ross i. 114 (1841). *B. praecox* Richardson, Frankl. Jour. App. 15 (1823); Hook. Fl. Bor.-Am. i. 39 (1829); T. & G. Fl. i. 75 (1838); not Sm. *B. vulgaris*, *β. gracilis* T. & G. l. c. (1838), perhaps not DC. *B. gracilis* Nutt. ex T. & G. l. c. (1838). *B. vulgaris*, var. *stricta* Gray, Man. ed. 2, 35 (1856) and subsequent Am. auth. in part, not Regel. *B. stricta* Fellm. Pl. Vasc. Lapp. 6 (1864-1869); Robinson in Gray, Syn. Fl. i. fasc. i. 150 (1895) in part; not Andrzej. *B. Barbarea* [as *barbarea*], var. *stricta* MacMillan, Met. Minn. Val. 259 (1892) in part, but not as to name-bringing synonym. *B. americana* Rydb. Mem. N. Y. Bot. Gard. i. 174 (1900). *Campe Barbarea* [as *barbarea*] W. F. Wight in Piper, Contr. U. S. Nat. Herb. xi. 303 (1906) in part, but not as to name-bringing synonym.—Banks of streams or in swamps, northern Labrador to northwestern Alaska, south to the St. John River, Maine, Mt. Washington, New Hampshire, shores and islands of Lakes Huron and Superior, Colorado, and southern California; also from north-eastern Asia to arctic Scandinavia. Passing by numerous gradations to

Var. *dolichocarpa*, n. var., siliquis patulis vel adscendentibus remotis vel subremotis subincurvis 2.5-5 cm. longis.—Siliques spreading or ascending, remote or subremote, somewhat incurved, 2.5-5 cm. long.—British Columbia to Wyoming, south to Lower California and central Mexico. Type collected on wet ground in woods, western Klickitat Co., WASHINGTON, May 19 and July, 1891 (*W. N. Saksdorf*, no. 2022). Some other numbered specimens are WYOMING, Union Pass, August 10, 1894 (*A. Nelson*, no. 864): CALIFORNIA, near summit of Mt. Sanhedrin, Lake Co., July 20, 1902 (*A. A. Heller*, no. 5925): ARIZONA, vicinity of Flagstaff, altitude 7000 feet, June 1, 1898 (*D. T. MacDougal*, no. 24): MEXICO, Cuantillan, Valley of Mexico, May 13, 1899 (*C. G. Pringle*, no. 7740).

OK. 2:150, 1928.

file notes. Fl. Kant. 2:150, 1928.

file in Kant. 2:150, 1928.

maintained by Regel. Fl. Prim. 372, 1932. not naturalized and apparently rejected by Hohen.

++ ++ Lower pedicels of the comparatively short and thick raceme subtended by leafy bracts.

B. PLANISILIQUA C. A. Meyer. Similar to *B. orthoceras* but with the shorter racemes bearing during anthesis 4-8 conspicuous lyrate-pinnatifid leafy bracts, which are somewhat deciduous in the mature plant; the sepals deeper-colored or purple-tinged; the petals 7-9 mm. long; the secondary racemes corymbiform; and the flattish ascending or erect siliques on comparatively slender pedicels and with more pronounced subconical beak.—C. A. Meyer in Middendorff, *Reise*, i. pt. 2, 14 (1856); Regel & Tiling, *Fl. Ajan.* 45 (1858). *B. vulgaris*, var. *arcuata* Robinson in Gray, *Syn. Fl. i. fasc. i.* 149 (1895) as to Alaskan plant, not Fries.—Southern Alaska and the Aleutian Islands to Kamtchatka and Amur. In its distribution very typical of the range of a considerable portion of the Aleutian flora — *Erigeron salsuginosus* (Richardson) Gray, var. *unalaschensis* (Less.) Macoun, *Arnica unalaschensis* Less., *Hieracium triste* Cham., &c.—which occurs from southern Alaska through the Aleutian Islands to the islands or mainland of Kamtchatka or Amur.

GRAY HERBARIUM.

STATUS OF *EPILOBIUM ALPINUM* AND *EPILOBIUM HORNEMANNI*.

ALBERT HANFORD MOORE.

While studying the alpine willow herbs from the White Mountains in connection with a flora of Coös County upon which Prof. Arthur Stanley Pease and the writer are engaged, I found that they presented a number of problems about which the widest differences of opinion have existed, the solution of which was by no means simple.

The opinion advanced, and I believe originated, by Haussknecht, that the seeds of *Epilobium alpinum* L. and *E. Hornemanni* Reichenb. are different, has been generally accepted since the publication of his monograph. He says of the seeds of *E. lactiflorum* Hausskn., by which name he calls *E. alpinum*, "testa glabra, lacunoso-impressa,"¹ but of the seeds of *E. Hornemanni* he says, "testa tenuiter papillosa."² Trelease in his Revision of the Genus *Epilobium*³ accepts this view

¹ Haussknecht, Monographie der Gattung *Epilobium*, 158 (1884).

² *Ib.* 174.

³ Missouri Botanical Garden Reports, ii, 75-116 (1891).

but admits having seen some smooth-seeded examples of *E. Hornemanni*. When I examined the seeds of these two species by reflected light under a moderately high power of the microscope, I found that some of them, indeed, plainly answered to the description *lacunosopressa*. A number of times I believed that I had a papillate seed before me, but by carefully focussing and varying the light I observed that it was an illusion. The seeds of both *Epilobium alpinum* and *E. Hornemanni* are in fact covered with pits, the walls of which are more or less prominent according as the seeds are old and shrivelled or in good condition. The former appear more strikingly papillate. This effect is produced by the light falling in a certain way on the margin or corners of the irregularly circular impression. How it is possible for a pit to look like a papilla is fairly well shown by some of the figures in Barbey's *Epilobium Genus a Cl. Ch. Cuisin Illustratum*. The artist has drawn shaded circles which on the margins of a seed resemble papillae.¹ In Haussknecht's monograph, plate 1, figure 13, represents a seed of *E. lactiflorum*, figure 18 one of *E. Hornemanni* Reichenb. The cuts show that so low-powered a lens was used that no certain judgment of the facts could have been formed.

The upper surface also of the seeds often looks papillate when the lighting is too bright. Any one familiar with a microscope knows that a too brilliant illumination makes it difficult to determine the true nature of structures which one apparently observes. I also investigated the seeds after they had been wet for a while, to see if they would look papillate after swelling, but with no different result. However, the most important thing for the present purpose is that the seeds of the two species do not differ in any respect.²

The only real characters suggested to distinguish the plants which have proved satisfactory are of relatively little importance, and I could find no others to supplement them. These differences are easy to see when the specimens are fresh, but difficult after they are dried, yet notwithstanding they can in many cases be made out with a fair degree of certainty even then. Collectors, however, should be urged to make careful notes on their labels.

In *E. alpinum* L., as that species has recently been understood by

¹ See, e. g., *Epilobium Khasianum* C. B. Clarke, pl. 16, fig. 5.

² Trelease in his monograph says that the seeds of *E. alpinum* are more attenuate, but this does not seem to hold either.

Trelease in his revision or in the seventh edition of Gray's Manual, for instance,¹ the flowers are white,² and the leaves are light green. The leaves have also been described as thinner than in *E. Hornemanni* Reichenb., but it is quite likely that this effect is optical, due to the greater translucency of the coloring matter. At best it is a very uncertain character, as the apparent difference is so slight that the leaves of *E. Hornemanni* may become thinner on pressing, if they are not sometimes so to begin with. In the last named species the flowers vary from rose or lilac to deep purple, the leaves being darker and often suffused with purple.³

In view of these facts it seems best to treat one of the species as a color form of the other, but before doing this it is necessary to make sure that *E. alpinum*, which is obviously the older name, has been correctly interpreted. In the *Species Plantarum*⁴ Linnaeus says nothing about the color of the flowers, but refers to a description in his *Flora Lapponica*⁵ which reads as follows:

EPILOBIUM foliis ovato-oblongis integerrimis.

? *Chamænirium alpinum alsines foliis*. Scheuch. alp. 59.

α Plantulam hanc bis vel ter in Alpibus lapponicis legi, præsertim ad latera earum, præcedentibus congeneribus mixtam.⁶

β *Caulis simplex, vix dimidii digiti longitudine, parum rubescens.*

Folia opposita, inferiora minora ovata, superiora maiora & magis oblonga, integerrima omnia.

Flores duo, rubri, parvi, caulem terminantes, petalis emarginatis purpureis.

γ Conueniunt hæc & antecedentes duæ (148.149.) florum corolla parua, petalisque bifidis & æqualibus.

Linnaeus likewise refers to *Epilobium foliis ovalibus, superioribus attenuatis* L. *Flora Suecica*, 111 (1745), which throws no light on the subject of color. From what has gone before, it would appear plain that it was *E. Hornemanni* which was meant and not the white-flowered form as has been supposed, but the matter is not quite so simple. Although this was apparently the older view (for if we turn to *Flora*

¹ Cf. also *E. lactiflorum* Hausskn, Monographie, 158; Gray Manual, ed. VI, 189 (1890).

² According to Gray Manual, ed. VII, 597 (1908) also "pinkish."

³ Mr. H. H. Bartlett assures me that it has been demonstrated in a number of analogous cases that it is the same purple coloring matter as in the flowers which makes the leaves darker or purplish.

⁴ p. 348.

⁵ p. 114 (1737).

⁶ Note the uncertainty.

Danica, ii, pl. 322 (1766) or to Sowerby's English Botany, xxvii, pl. 2001 (1819), for example, we find *Epilobium alpinum* L. represented as having purple flowers and various synonyms of *E. alpinum* prove to have had colored ones), nevertheless Haussknecht¹ adopts the name *lactiflorum* for the white-flowered plant, describing it as having milk-white flowers (flores lactei), maintaining that the Linnaean *E. alpinum* was a *species mixta* consisting of two elements, a white-flowered form, represented by two specimens in the herbarium of Linnaeus, the one doubtfully, the other certainly identified, and the *Chamaenirium alpinum alsines foliis* Scheuch. questioningly cited in the Flora Lapponica, but unfortunately taken over into the Species Plantarum without any mark of interrogation. In this Haussknecht says that Scheuchzer first included *E. anagallidifolium* Lam. and *E. alsine-folium* Vill., but subsequently the latter only. In his monograph, under the caption of *E. lactiflorum*, Haussknecht says, "Nach Ansicht der meisten Scandinavischen Botaniker wäre in dieser Pflanze das eigentliche *E. alpinum* L. zu erblicken, weil dieselbe sowohl in Linné's Herbar als *E. alpinum* vorhanden ist und die Phrase in Fl. Lapp. und in Fl. Suec. nur auf diese gedeutet werden kann,² abgesehen von den dabei gegebenen, zu *E. anagallidif.* gehörenden Citaten." Further on he continues, "In Annotat. pl. Scand. herb. L. 1849 sagte bereits Hartman, dass das *E. alpinum* im Herb. Linné völlig mit der obigen Art [*E. lactiflorum*] übereinstimme." This is what Hartman says,³ *E. "alpinum 7 (manu propr.). Nihil, nisi floribus tribus (pro 'duobus') foliis subdenticulatis (pro 'integerrimis'), atque caule paulum altiore a descriptione Linnaeana numeri 150 Fl. Lapp.⁴ differens, hoc specimen optimum est E. alpinum Suecor. recent."*⁵ Nor under the other specimen referred to by Haussknecht does Hartman refer to the color, but says, "Haec est forma pumila biuncialis, etiam melius ac praecedens Florae Lapp. l. c. respondens . . ." At the end he adds the note, "Nullae aliae huius tribus, nec numeris 147 et 149 Fl. Lapp. respondentes, formae in herbario Linnaei adsunt." Under *E. alpinum* L. in his Handb. Skand. Flor. ed. XI, 263 (1879) Hartman cites Svensk.

¹ l. c.

² It has already been noted that the Flora Lapponica calls the flowers "rubri," the Flora Suecica not mentioning the color.

³ Annotat. Plant. Scand. Herb. Linn. (Ex Act. Reg. Acad. Scient. Holm.) 76 (1849).

⁴ See quotation of this description, above, p. 143.

⁵ As we shall see presently *E. alpinum* Suecor. recent. is no clearer than any other *E. alpinum*.

Bo⁴. x, pl. 707, 1826–1829 (a most excellent figure of *E. Hornemanni*) and the plate, *Flora Danica* ii, 322, already mentioned, but in the description he says, “kronbl. . . . violetttröda . . . ell. hvita” and adds “Den mer högväxta och uppräta formen med flere blr och oftast hvita är *var. Hornemanni* (*Reich. pl. crit.* 2).”¹ This confused account does not seem definite enough to deny or affirm the strong implication of the *Annotationes*, for the description of the species may well be intended to include that of the variety. The conception of the white-flowered element seems thus to be disposed of, and even if it afterwards proved that the Linnaean specimens really had white flowers, they are not type specimens in our modern sense, so that such a discovery could not be taken as controverting the strong evidence that Linnaeus had a purple-flowered plant in mind when he wrote. The field now lies between *E. anagallidifolium* Lam. and *E. Hornemanni* Reichenb. The description given by Linnaeus in the *Species Plantarum*, as in the *Flora Lapponica*, answers much better to that of the leaves of *E. Hornemanni*, than to that of the narrowly elliptic to oblong leaves of *E. anagallidifolium*.² In the *Species Plantarum*, in addition to the doubtful Scheuchzerian name, is cited the name *Epilobium foliis ellipticis, obtuse lanceolatis* Haller Enum. Meth. Stirp. Helv. Indigen. i, 408 (1742). Haller writes of it as follows: *Folia in rarioribus conjugationibus, ima ovata, superiora longiusculo mucrone in obtusam ellipsin attenuata, brevibus denticulis serrata. Flores . . . petalis dilute purpureis. . . .*³ From this it is evident that *E. Hornemanni* was included,⁴ and if *E. alpinum* L. really is a mixed species, it depends for that character upon the reference to Scheuchzer. It would be very satisfactory to be able to remove this objection as well, but unfortunately Scheuchzer's work is not at hand. However, according to the so-called doctrine of remainders, which has been generally accepted and which, though it finds no adequate expression in the Vienna code, seems to be undoubtedly included in it,⁵ the name *E. alpinum* must stand for *E. Hornemanni*, since the latter and its

¹ See footnote, 1, below, p. 146.

² In *E. anagallidifolium*, too, the leaves are almost alike, whereas in *E. Hornemanni* the upper leaves tend to be more attenuate than the lower.

³ N. B. purple flowers again.

⁴ Cf. also the name used in the *Flora Suecica*, *E. foliis ovalibus, superioribus attenuatis* L.

⁵ See *Règles Internat. Nomencl. Congr. Internat. Bot. Vienne Sect. 6, Arts. 44 and 47* (1905). I am indebted to Dr. B. L. Robinson for invaluable assistance in interpreting these rules.

oldest synonym *E. nutans* Hornem.¹ were both described later than *E. anagallidifolium* Lam. or *E. alsinefolium* Vill.; in other words it alone is left after the supposed conflicting elements have been removed. Now taking up the synonymy which Haussknecht gives for his *E. lactiflorum*; *E. alpinum* L. and *E. nutans* Hornem. have already been discussed. *E. alpinum* L. β . *fontanum* Hornem., not Wahl., is a pure synonym of *E. nutans*, having been based directly upon it without any accompanying description. (Under *E. alpinum* L. var. *fontanum* Wahl. Flora Lapponica, 95 (1812), the author cites as the first synonym *E. alsinefolium* Vill.² This, as far as one can tell without going deeply into the matter, is a purple-flowered species of Europe, and certainly as far as the plate is concerned it is a very distinct species.) *E. alpinum* L. β . *majus* Wahl. Flora Suec. i, 234 (1824) is also founded on *E. alsinefolium* (and hence is purple-flowered). *E. origanifolium* Lam. γ . *intermedium* Lindbl. Physiogr. Tidskr. 1838, is a reference given by Haussknecht. The periodical appears to be a very rare one, but an article on *Epilobium* by the same author occurs in Flora.³ According to this, Lindblom's variety is based on *E. alpinum* L. γ . *nutans* Hartm. Handb. Skand. Flor. ed. III, 91 (1838). (Here is cited again Svensk. Bot. x, pl. 707 and Flora Danica, ii, 322.) *E. alpinum* L. var. *majus* Fr. Novit. Fl. Suec. Mant. ii, 20 (1839) is the only name remaining to be considered. In a note Fries says, "in var. *majori* semper lacteis." Here then for the first time is a mention of white flowers, but the only synonym given is *E. alpinum* L. γ . *nutans* Hartm. which, as we have just seen, has purple flowers. There seems therefore to be no available name for the white-flowered plant except *E. lactiflorum* Hausskn.

For convenient reference, I give below the correct names of the two plants with a summary of their more important synonymy.

EPILOBIUM ALPINUM L. floribus inter lilacinos et purpureos variantibus.—Sp. Pl. ed. I, 348 (1853); Flora Dan. ii, pl. 322 (1766); Svensk. Bot. x, pl. 707 (1826–1829); Sowerby Engl. Bot. xxviii, pl. 2001 (1819); Hartm. Annotat. Plant. Scand. Herb. Linn. (ex Act. Reg. Acad. Scient. Holm.) 76 (1849).

¹ *E. Hornemanni* Reichenb. Iconogr. Bot. seu Plant. Crit. ii, 73, pl. 180, f. 313 (1824) was based on *E. nutans* Hornem. Flora Danica, viii, pl. 1387 (1810) which is an illustration of a plant with lilac flowers, in all respects resembling our common alpine species. It is interesting to note that the Index Kewensis correctly includes *E. Hornemanni* as a synonym of *E. alpinum*.

² Figured, Flora Dan. xv, pl. 2587 (1861).

³ xxiv, 596 (1841).

E. foliis ovato-oblongis integerrimis L. Flora Lapp. 114 (1737).

E. foliis ellipticis, obtuse lanceolatis Haller Enum. Meth. Stirp. Helv. Indigen. i, 408 (1742).

E. foliis ovalibus, superioribus attenuatis L. Flora Suec. 111 (1745).

E. nutans Hornem. Flora Dan. viii, pl. 1387 (1810).

E. alpinum L. β . *fontanum* Hornem. Hort. Reg. Bot. Hafn. 365 (1813), not Wahl.

E. Hornemanni Reichenb. Iconogr. Bot. seu Plant. Crit. ii, 73, pl. 180, f. 313 (1824); Hausskn. Monogr. Gatt. Epilob. 174, pl. 1, fig. 18 (1884); Trelease Mo. Bot. Gard. Rep. ii, 105 (1891); Gray Man. ed. VI, 189 (1890); Id. ed. VII, 597 (1908).

E. alpinum L. var. *nutans* Hornem. Nomencl. Flora Dan. Emend. 66 (1827) (incorrectly attributed by Haussknecht to Lehmann).

E. alpinum L. γ . *nutans* Hartm. Handb. Skand. Flor. ed. III, 91 (1838).

E. origanifolium Lam. γ . *intermedium* Lindbl. Physiogr. Tidskr. 1838;¹ Flora xxiv, 596 (1841).

E. alpinum L. var. *majus* Fr. Novit. Fl. Suec. Mant. ii, 20 (1839).

E. ALPINUM L. f. ***lactiflorum*** (Hausskn.) A. H. Moore comb. nov. floribus lacteis vel raro colore roseo paulum tinctis.

E. alpinum Auct., not L.

E. alpinum L. var. *majus* Fr. Novit. Fl. Suec. Mant. ii, 20 (1839), as to note following description, but not as to synonym.

E. lactiflorum Hausskn. Monogr. Gatt. Epilob. 158, pl. 1, fig. 13 (1884); Trelease Mo. Bot. Gard. Rep. ii, 108 (1891), under the head of *E. alpinum* L.; Gray Man. ed. VI, 189 (1890); Id. ed. VII, 597 (1908), under *E. alpinum* L.

CAMBRIDGE, MASSACHUSETTS.

¹ Citation quoted from Haussknecht.

A *TEUCRIUM* NEW TO MASSACHUSETTS.—While botanizing on Cape Ann, Massachusetts, last September I noted with particular interest a species of *Teucrium* established a short distance east of Rockport very close to the shore. The plant was subsequently identified by Prof. M. L. Fernald as *Teucrium occidentale* Gray, var. *boreale* (Bicknell) Fernald. The colony comprised possibly 6 or 8 individual plants in various stages of maturity. Several were even then in full flower while others with mature spikes illustrated the characters in the calyx-lobes very plainly. The record seems of interest in that it extends the known range of the plant quite appreciably to the east and south.—EDWIN B. BARTRAM, *Wayne, Pa.*

THE NEW ENGLAND FEDERATION OF NATURAL HISTORY SOCIETIES will hold a field meeting at Portland, Maine, July 6–12. A series of attractive excursions has been arranged to the neighboring beaches, islands, to Sebago Lake, the tourmaline quarry at Auburn, etc., also a dredging expedition. Headquarters of the meeting will be at the rooms of the Portland Society of Natural History, 22 Elm Street, near Monument Square, Portland. For further information persons interested should apply to J. H. Emerton, 194 Clarendon Street, Boston.

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